bris in some ways: its color is dark brown, or brownish-orange in faded specimens, and it is crowned with a wide white crenulated zone below the sutures. Otherwise, it differs from M. lugubris as follows: it is a slimmer shell, more ovate than pyriform; its aperture is shining and white instead of dull brown; its lip is effuse instead of following the pyriform outline; but most of all, the true M. coronata lacks the white base which is the most striking feature of M. lugubris. This white base is visible from the dorsal side of the anterior tip of the shell; on the ventral side it extends to the adapical fold of the columella. The remainder of the columella is brown, as is the labral side of the aperture except where the white subsutural band may be seen from inside.

Mitra tiarella A. Adams, 1851 (M. lugubris honoluluensis Pilsbry, 1920) differs from M. lugubris and M. coronata in that it exhibits a narrow pale band below the sutures, and its crenulations are white on a brown background, there being no solid white subsutural zone.

Correct Illustrations of the Above Species:

Mitra lugubris Swainson, 1822 (see Plate 29, figure 1):

1822 Swainson, William. Zoological Illustrations, Vol. 2, Pl. 66, upper and lower figures.
1839 Kiener, L. C. Icon. Coq. Viv., Mitra, Pl. 30, fig. 100.
1841 Küster, H. C. Conchylien-Cabinet, Mitra, Pl. 17e, fig. 1.
1844 Reeve, Lovell A. Conch. Icon., Mitra, Pl. 10, fig. 72.
1856 Wood, W. Index Testaceologicus, Supplement Pl. 3, fig. 12a.
1874 Sowerby, G. B. Thes. Conch., Mitra, Pl. 13, fig. 199 (only).

Mitra coronata Lamarck, 1811 (see Plate 29, figure 2):

.... Encyclopédie Méthodique, Pl. 371, figs. 6a, 6b.
1839 Kiener, L. C. Icon. Coq. Viv., Mitra, Pl. 18, fig. 60a (only).
1841 Küster, H. C. Conchylien-Cabinet, Mitra, Pl. 26, figs. 5, 6.
1844 Reeve, Lovell A. Conch. Icon., Mitra, Pl. 14, figs. 104a, 104b.
1856 Wood, W. Index Testaceologicus, Voluta, Pl. 21, fig. 146a.
1860 Chenu, J. C. Man. Conchyl., Vol. 1, p. 193, fig. 904.
1874 Sowerby, G. B. Thes. Conch., Mitra, Pl. 13, figs. 200, 201, 220.
1882 Tryon, George W., Jr. Man. Conch., Vol. 4, Mitridae; Pl. 44, figs. 284, 285.
1946 Edmondson, C. H. Reef and Shore Fauna of Hawaii, p. 127, fig. h (as M. lugubris).

Mitra tiarella A. Adams, 1851 (see Plate 29, figure 3):

1874 Sowerby, G. B. Thes. Conch., Mitra, Pl. 5, fig. 56; Pl. 13, figs. 215, 217.
1920 Pilsbry, Henry A. Proc. Acad. Nat. Sci. Phila., Vol. 72, pl. 12, fig. 16 (as M. lugubris honoluluensis).

Other species in this group include Mitra aurora Dohrn, 1861 (Plate 29, figure 4), and M. floridula Sowerby, 1874 (Plate 29, figure 5). Mitra aurora resembles M. tiarella, but is generally smoother, especially in the middle of the last whorl; it is, additionally, dotted and speckled with white, marked with large irregular white blotches below a white subsutural band, and is a deep rusty-red color in live-taken specimens. It is known from Hawaii, the Cook Islands, Tahiti, the Paumotus and the Philippines.

Mitra aurora has frequently been associated with M. coronata as a subspecies, but since it maintains constant morphological characteristics throughout its range, I prefer to restore it to its original rank as a full species. Even if it were a subspecies, it would have to be assigned to M. tiarella instead of M. coronata.

Mitra floridula Sowerby, 1874 resembles M. aurora but is larger, more ventricose, with broad spiral ribs and deeply punctured spiral grooves. It exhibits a much coarser appearance than any of the other species discussed here. It is recorded from Japan, the Ryukyus, and Mauritius.

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I wish to thank Dr. Myra Keen for her kind cooperation in furnishing the exact Helbling reference, which was only alluded to in Dautzenberg and Bouge (1922). Dr. Keen's many important contributions to malacology are more than equalled by her gracious helpfulness to students and fellow workers.

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A Study of the Reproductive Cycle in the California Acmaeidae (Gastropoda)

Part IV

by

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(Plates 30, 31 and 32)

Discussion

In Parts I-III (Fritchman, 1961a, b, c) of this paper the reproductive periods of eleven species of the limpet Acmaea Eschscholtz 1833 have been reported for the latitude of San Francisco, California. An effort will now be made to correlate these periods with the latitudinal distribution of the species.

The effects of temperature on the breeding and distribution of marine invertebrates have long been noted and discussed. From his studies of the invertebrate fauna at Plymouth, Orton (1920) concluded that the breeding season seemed to be limited by apparently constant maximum or minimum temperatures, or both, which seem to be physiological constants for the species. In addition, he believes that the greatest influence of temperature is at the maximal or minimal temperature for the locality investigated. Runnstrom (1927) working at Bergen showed that the ranges of temperature in which the development of larvae was possible were correlated with the origins of the different faunae producing the larvae. Thus, the northern forms had a much lower range of temperature for development than did the southern faunal components. In addition, he found that the earliest developmental stages were most affected by the temperatures, the larvae and the adults becoming increasingly less sensitive to temperature conditions. Further work by Runnstrom (1929) demonstrated that breeding sea-